information services at the packet level.[66] Therefore it will be quite difficult for ISPs to segregate revenues into these jurisdictions as required by the current USF contribution regime.[67]

Most ISP services currently available are completely distinct from the telecommunications services currently subject to direct USF assessments. For example, imposing direct USF contributions on web hosting revenues would be akin to assessing USF obligations on the revenues of telephone direct marketers or database companies like Lexis. Rather than targeting the online-based services for additional taxes, we should treat the two the same: assess USF contributions against the underlying telecommunications services used to provide the final good. In this manner we do not create a policy distortion favoring one type of service over another.

IV. TELECOMMUNICATIONS SERVICES GENERATED BY ONLINE USAGE HAVE BEEN INCREMENTAL

I have demonstrated that production and consumption of online services has generated a substantial amount of telecommunications services expenditures. Equally important, these expenditures were incremental telecommunications services expenditures; they were "in addition to", rather than "instead of", consumers' expenditures on traditional PSTN services.

From the first appearance of online services in the early 1980s until the present, essentially all of the telecommunications traffic generated by those services has been incremental to PSTN traffic rather than displacing it. Since ISP offerings have not competed with PSTN offerings, all online-service-derived purchases of telecommunications services have increased the USF funding base.

Most ISP services clearly do not compete with PSTN services. For example, voice telephony has never offered any widely-used services comparable to online "chat" or personalized news retrieval.

The lack of any significant displacement of PSTN service consumption by online services can be seen by looking at e-mail and file transfers. E-mail is one of the more popular online service offerings.[68] Use of email generates incremental USF contributions: incremental e-mail use is incremental online activity and, as just demonstrated, incremental online activity generates incremental USF contributions based on the value of telecommunications services consumed.[69]

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[66] See MacKie-Mason (1998), pp. 9-10.

[67] Inter@ctive Week reported that some RBOCs claim all Internet traffic is "interstate" but that all 12 state public utilities commissions that have ruled on the issue have decided Internet traffic is considered "local". See Trager, Louis , "Alternative Carriers Applaud Texas Ruling on Internet Fees," Inter@ctive Week, 6 February 1998.

[68] 84% of respondents to GVU's survey said email was indispensable. Georgia Institute of Technology, "Indispensable Technologies," http://www.gvu.gatech.edu/user_surveys/survey-1997-10/, 22 January 1998.

[69] Furthermore, it is not clear that e-mail adds any price increment above the cost of the telecommunications services consumed in providing it: the market price for e-mail is zero. (A 5-minute search of the web turned up a hot-linked list of 12 free-e-mail providers. See http://www.westsound.com/ptmudge/email.htm. Included on the list are such well known Internet services and content providers as Hotmail and Yahoo.) Given that the price of e-mail is zero, the USF base from e-mail service revenues is equivalent to the revenue from the telecommunications services used to provide e-mail. This implies that taxing the underlying transmission facilities, as is currently done, yields revenues equivalent to taxing e-mail service without creating the additional costs of bringing an entirely new class

File transfer — giving customers a means to download files from various locations — is another common ISP service. This service is somewhat comparable to automated fax-back services offered over PSTN[70] or online data services such as Lexis. Again, there is no reason to treat the alternate delivery methods differently and we should continue the current FCC policy of making USF assessments on the underlying telecommunications services rather than on the fax-back service provider, the database company, or ISP revenues.

The trend in long distance telephone usage does not seem to indicate a reduction due to growing use of e-mail and file transfer: long distance calls and minutes have been on a fairly stable upward trend for years.[71] It is not surprising that there would be no effect from these new services: when one looks more closely, the online and PSTN-based services are not very good substitutes. For example, file transfer allows me to manipulate the document I retrieve.[72] On the other hand, if I am trying to purchase a house and want to quickly transmit a signed document to my realtor, online file transfers are of little value while a fax serves the purpose very well.

Additionally, it seems unlikely that the lack any of obvious impact on long distance usage is due to there being a small number of Internet users to date or a small volume of e-mail relative to long distance telephone calls. As early as 1996, e-mail was already significant relative to voice calls: an admittedly rough calculation suggests that there were 15% as many e-mail messages as long distance telephone calls.[73] And, as I discussed above, the impact of online service users on local call DEMs is readily apparent.[74] The logical conclusion is that there has been little displacement of long distance traffic by e-mail or file transfer activity. This conclusion is supported by MMTA.[75]

V. CONCLUSION

I have demonstrated that:

- ISPs have <u>not</u> been "free riding" on the USF contributions of others. Rather, ISPs, both through direct payments to telecommunications carriers and by stimulating online users' demand for telecommunications services, have created very significant

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of service providers into the USF reporting bureaucracy. [See MacKie-Mason (1998) at 10 for comments relating to the administrative inefficiency aspects of direct ISP contributions to USF.]

[70] For example, Ameritech offers a number of product information documents via both fax-back and web download. See http://www.ameritech.com/

[71] See Chart 9, LONG DISTANCE ACCESS MINUTES

[72] For example, when I quoted from Sprint's Comment on the WorldCom/MCI merger, I merely "cut and pasted" from an electronic document I downloaded from the FCC site.

[73] In March 1997, AOL users were averaging 1.32 e-mails per user per day [10.5mm e-mails/day, 8 million users; "Comments of AOL in the Matter of ... CC Docket 96-263, March 24, 1997 at 1,4]. Assume that was typical for all users. There were roughly 30 million online users in 1996 (FIND/SVP May 1997), meaning roughly 40 million e-mails per day. In 1996, reporting LECs carried 94.1 billion toll calls (FCC, *1996 SOCCC*, Table 2.6). That equals 257.7 million long distance phone calls per day, or that there are 15% as many e-mails as long distance phone calls.

[74] See the analysis of local-call DEM in §II.A.2.b.

[75] "The explosive growth in the use of e-mail, for example, has coincided with an uptick in toll call spending, the segment of the market that was presumably at risk." *MMTA* 98 at 53.

increases in telecommunications services revenues and thereby contributed significantly to Universal Service policy goals.

- Over the past seven years, online service consumption has generated roughly between $10 billion and $28 billion of incremental telecommunications services revenue and stands to generate between $6 billion and $17 billion or more this year.
- Using the mid-point between these ranges, telecommunications services revenue attributable to online service production and consumption are roughly $11.4 billion for 1998 expenditures and $18.7 billion for 1990-1997 expenditures.

I expect demand for the ISP offerings I have discussed to continue growing, implying the USF-generating telecommunications services expenditures I have discussed will also continue growing.

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VII. Appendix: Business and ISP expenditure calculation

The model has these basic assumptions:

1. All residential consumers connect via dial-in access; I ignore all residential consumer expenditures - I am only estimating ISP and business expenditures with this model
2. ISPs have 15 dial-up customers per dial-up modem, with 1 "line" to the LEC per modem[76]
3. ISP connections to the LEC cost $15.05 per line[77]
4. A T1 line supports 24 modems and costs $370 per month.[78]
5. Businesses pay $0.02 per minute for outgoing "dial-in" calls[79]
6. T1 lines are leased from a telecommunications services provider and incur USF obligations.
7. Business dial-in line base charges are not attributed to online usage and are ignored
8. The number of online users in 1998 will be 15% higher than in 1997.[80]

One significant reason I have relied on the Pacific Telesis assumptions is that I expect them to be conservative: the intent of Pacific Telesis' model was to demonstrate the significant losses they are incurring due to ISPs.

The model is detailed in the printouts on the following pages. The first page is the "Upper estimate". It uses a high estimate of the number of online users; a low estimate of the share that is residential users (giving a high estimate of the share that is business use); and a high estimate of online use per user per day.

The second page is the conservative estimate. It uses an average of population estimates and residential share from three surveys. I assume 1/3 of business users are dial-in and the rest have dedicated lines, used rather intensely (240 users per T1). I also ignore the length-of-line charges on T1 leased lines.

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[76] This number was used by Pacific Telesis. Pacific Telesis, "Surfing the 'Second Wave'," Pacific Telesis 'White Paper', 1 June 1997 at Part III, n. 15. This is in the range suggested by Leida. Note, however, that if a dial-in line supports 15 users, each of whom is online for 45 minutes each day, the line will be in constant use for over 11 hours each day.

[77] Pacific Telesis (1997) at Part III, n. 15

[78] Leida (1997) at 76

[79] *Trends* 98, Table 14.1

[80] This is loosely based on an IDC survey predicting 23% of US households would be online at the end of 1998. The study reported 20% of US households were online at the end of 1997. In assuming 15% growth, I have ignored the (slight, positive) effect of the growth in the number of US households that will occur in 1998. IDC Market Research, "Prediction: 23 Percent of all Households Online by 1998," http://www.idc.com/F/HNR/330.htm, 7 April 1998.

Quantifying the Contribution:
Estimates of Telecommunications Expenditures

A. Calculations Underlying Upper Estimate of Business and ISP Expenditures

	A	B	C
1	**Users**		**Sources**
2	Internet users (mill)	71.3	Intelliquest 2/98 estimate of 4th quarter 1997, increased 15%
3	Residential share	0.63	FIND/SVP
4	Residential users (mill)	44.92	D2 / D3
5	Business users (mill)	26.38	D2 - D4
6	Minutes per day	45	Pacific Telesis
7			
8			
9	ISP Lines		
10	Users per line	15	Pacific Telesis,
11	Cost/line/month	$19.28	Pacific Telesis ($15.05) + $4.23 incremental SLC/PICC charge for 1998 (from McKnight and Leida)
12			
13	Lines for Residential users (mill)	2.99	B4 / B10
14			
15			
16	ISP dial-in lines for business	1.76	B5 / B10
17	ISP total dial in lines	4.75	B13 + B16
18	ISP dial-in line cost/month ($mill)	91.64	B17 * B11
19	ISP to LEC cost/year ($mill)	1,099.73	B18 * 12
20	ISP backbone/year ($mill)	2,231.98	B19(B19-B17*4.23*12) * 2.6; Leida results at p. 149-150 give backbone = 2.6x local expenditure; subtracted off 1998 SLC/PICC increases
21			
22	Business expenditure		
23	Outgoing call minutes/day (mill)	1187.1	B5 * B6
24	Cost per minute	$0.02	Trends 98, Table 14.1
25	Business expenditure/day ($mill)	23.74	B23 * B24
26	Business expenditure/year ($mill)	8666.16	B25 * 365

B. Calculations Underlying Conservative Estimate of Business and ISP Expenditures

	A	B	C	D
1	**Users**			Sources
2	Internet users (mill)	53.7		avg, FIND/SVP, IQ 12/96, IQ 12/97; +15%
3	Residential share	0.67		average, FIND/SVP, IQ 12/96, IQ 12/97
4	Residential users (mill)	35.8		B2 / B3
5	Business users (mill)	17.9		B2 - B4
6	Minutes per day	30		Leida (1997) p. 47
7				
8				
9	**ISP Lines**			
10	Users per line	15		Pacific Telesis,
11	Cost/line	$19.28		Pacific Telesis ($15.05) + $4.23 incremental SLC/PICC charge for 1998 (from McKnight and Leida)
12				
13	Lines for Residential users (mill)	2.39		B4 / B10
14		Business Dial-in	Business Direct	
15	Dial-in share	0.33	0.67	assume 1/3 dial in, 2/3 direct connections
16	Dial-in/direct user counts	5.91	11.99	B5 * B15; B5 * C15
17	ISP dial-in lines for business	0.39	-	B16 / B10
16	ISP total dial in lines	2.78	-	B13 + B17; B13
19	ISP dial-in line cost/month ($mill)	53.61	-	B18 * B11; C18 * B11
20	ISP to LEC cost/year ($mill)	643.35	-	B18 * 12
21				
22	**Business expenditure**			
23	Outgoing call minutes/day (mill)	177.23	359.82	B6 * B16; B6 * C16
24	Cost per minute	$0.02		Trends 98, Table 14.1
25	Concurrent users per T1		24	technology; assumes no multiplexing
26	T1 hours available per day		5	assumes each channel used 5 hours/day
27	"User-minutes"per T1 per day		7200	C25 * C26 * 60
28	Leased line count (mill)		0.0500	C23 / C27
29	cost/month/T1		$370.00	Leida, p. 76
30	Business expenditure ($mill)	106.33	18.49	B23 * B24; C28 * C29
31	Business expenditure/yr ($mill)	1276.03	221.89	B30 * 12
32	Total Business expend/yr, ($mill)	1497.92		B31 + C31
33	ISP local expenditure/yr ($mill)	643.35		B20
34	ISP backbone expenditure	1255.50		B33(B33-B16*4.23*12) * 2.5; Leida results at p. 149-150 give backbone = 2.6x local expenditure; use 2.5x to be conservative; subtracted off 1998 SLC/PICC increases
35				
36	Note: 24 concurrent users * 5 hours/day & 30 minutes/users means 240 users/T1 line			

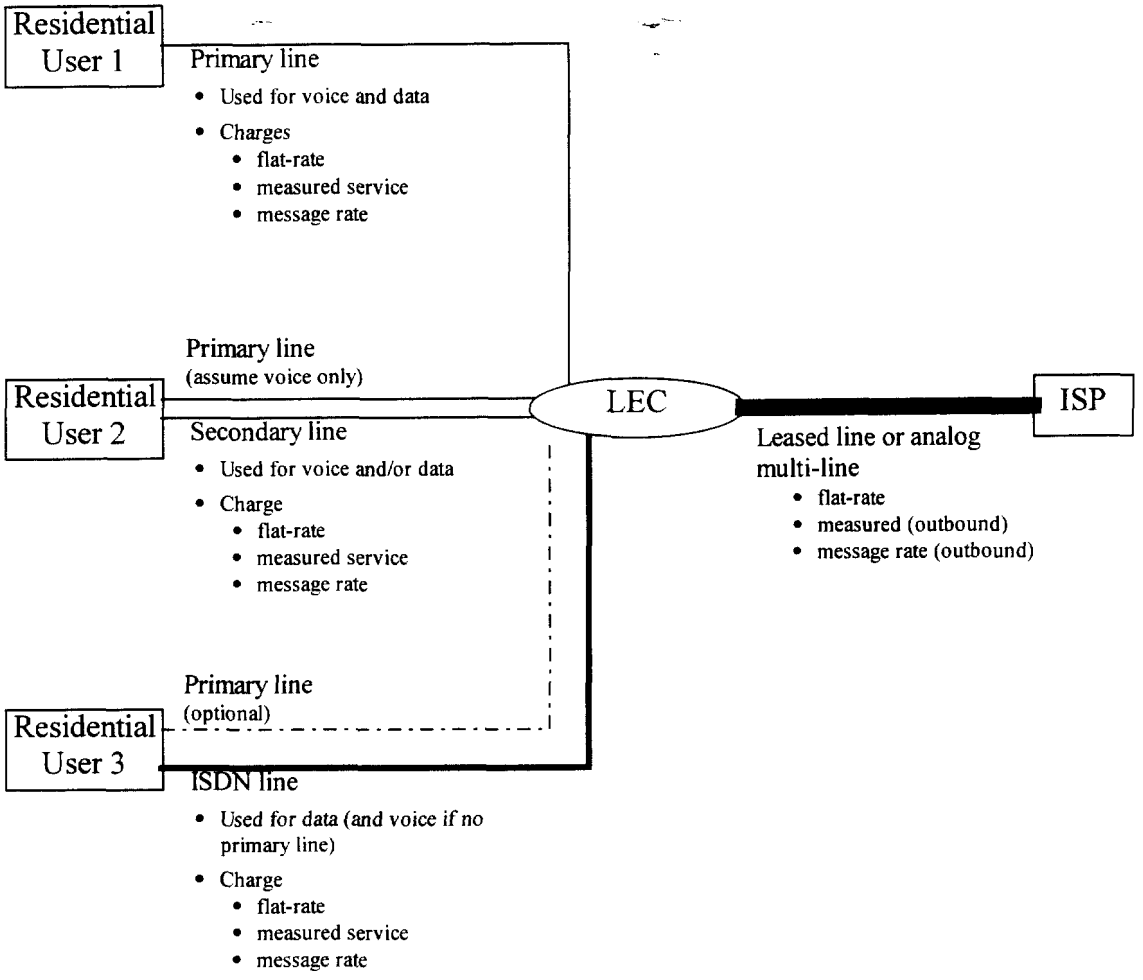

FIGURE 1, RESIDENTIAL ONLINE SERVICE USER CONNECTION SCHEMATIC

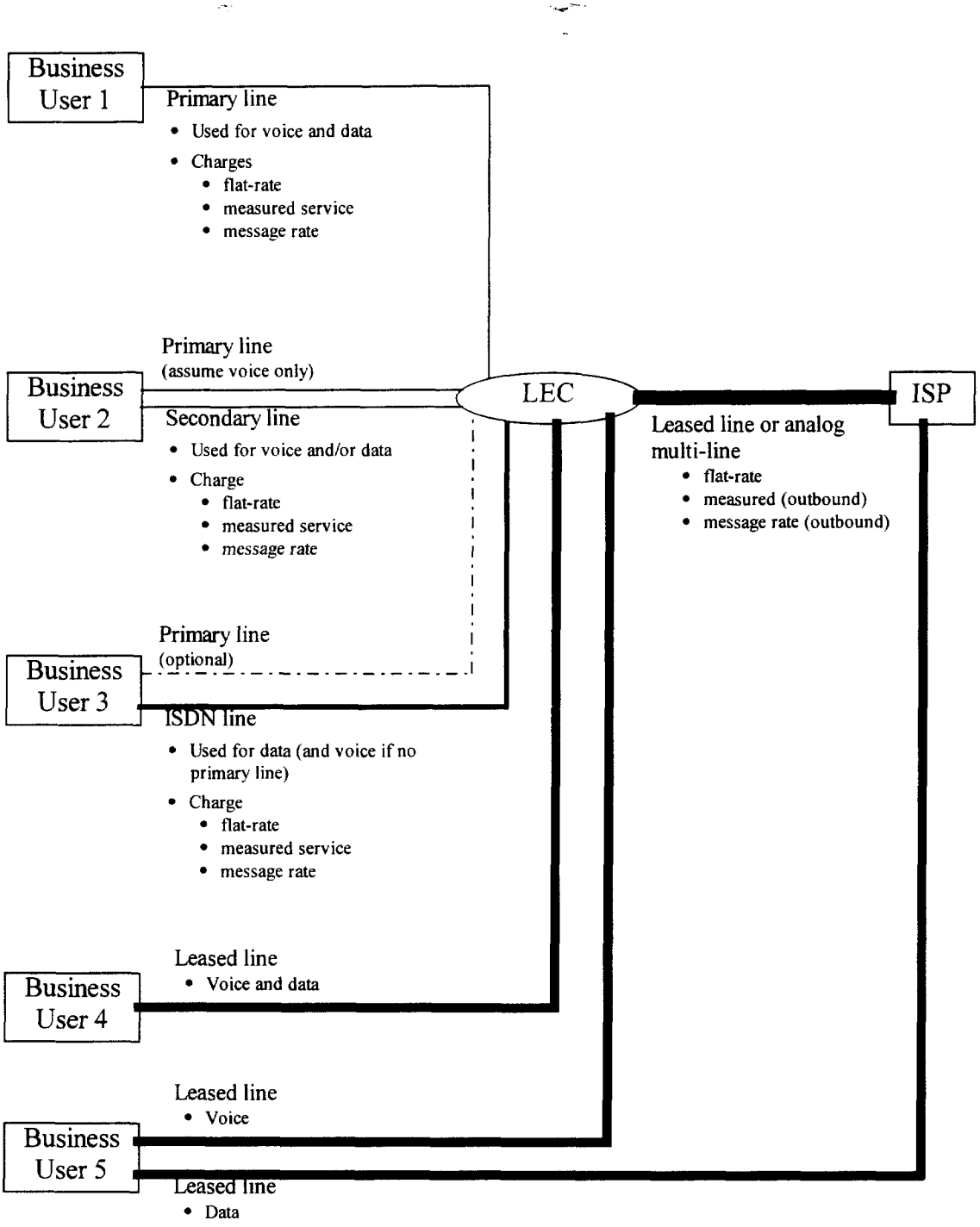

FIGURE 2, BUSINESS ONLINE SERVICE USER CONNECTION SCHEMATIC

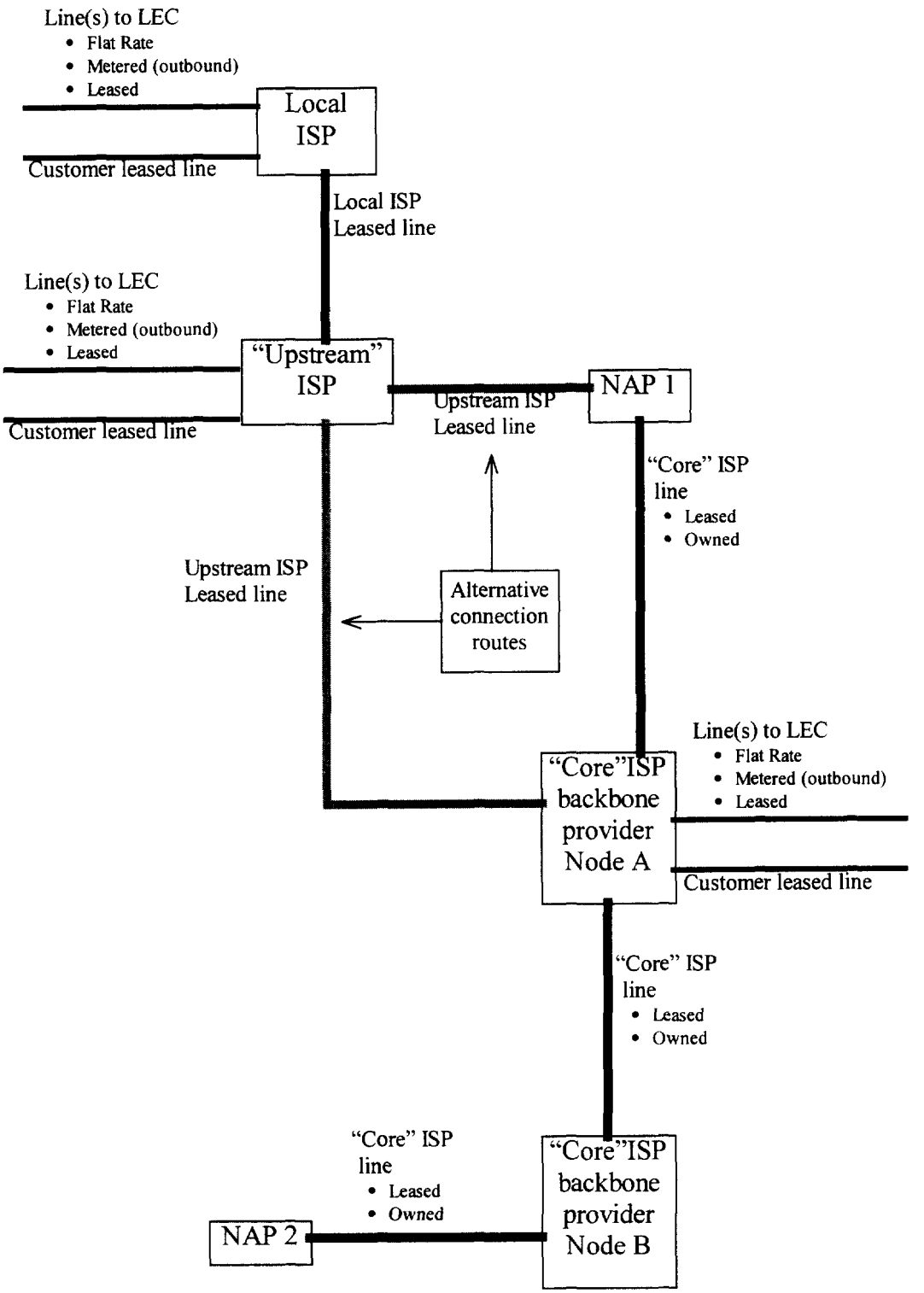

FIGURE 3, ISP INTERCONNECTION SCHEMATIC

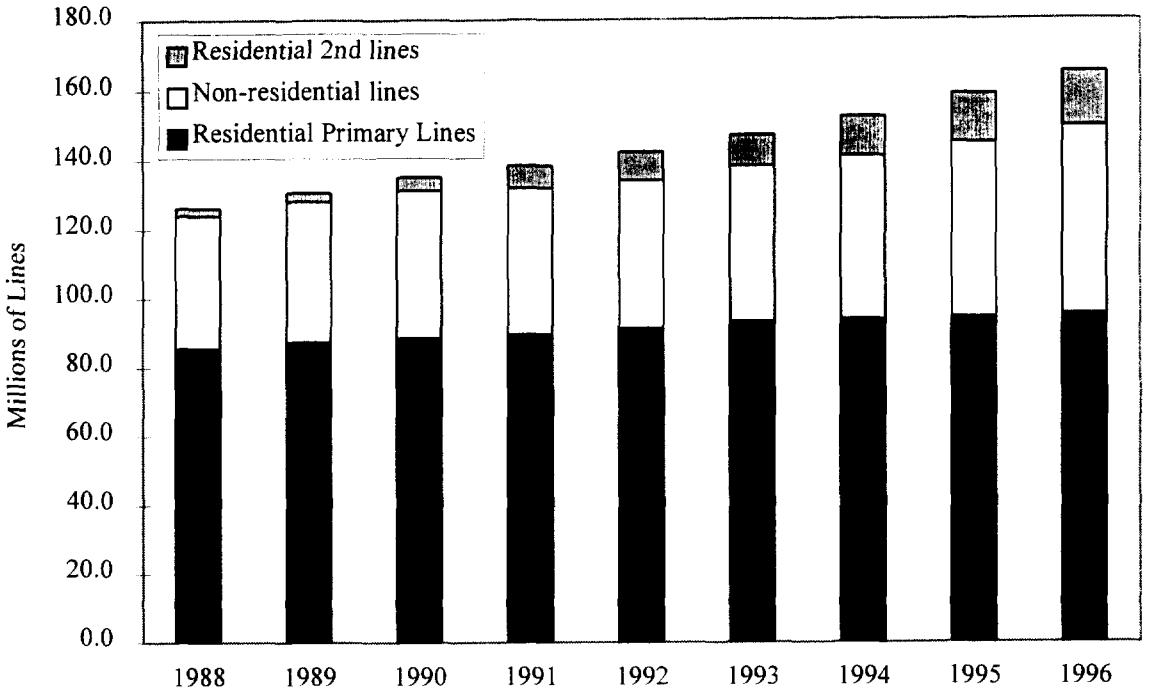

CHART 1, NUMBER OF LOCAL LINES BY TYPE

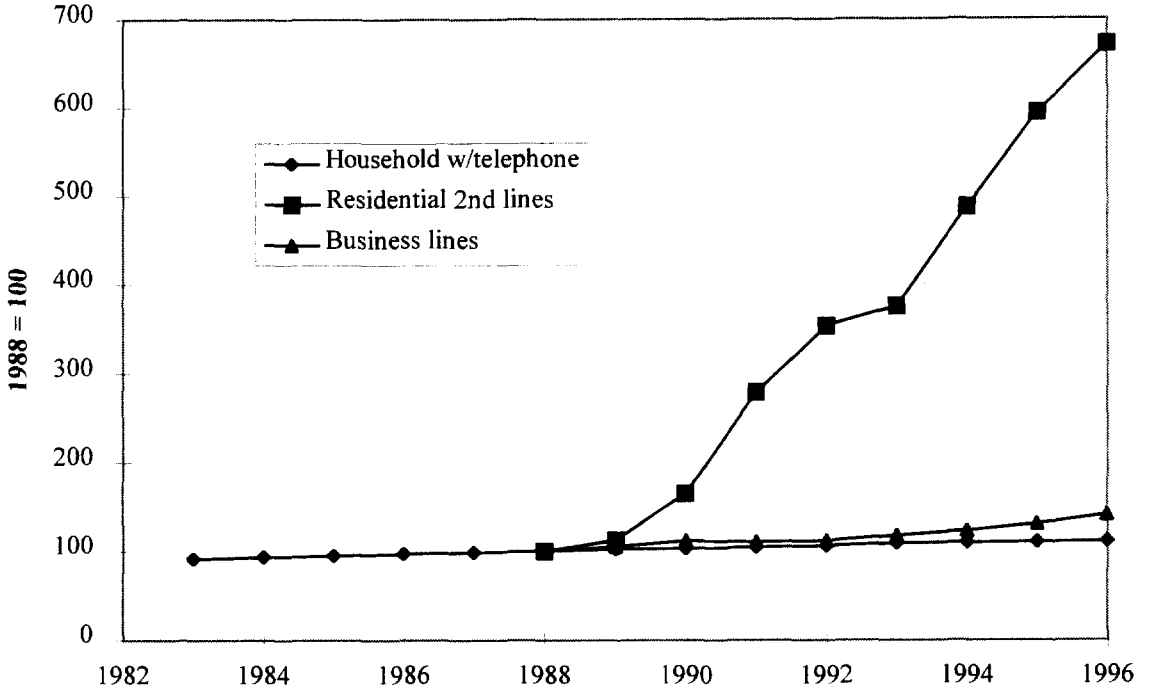

CHART 2, GROWTH IN LOCAL LINES BY TYPE

Quantifying the Contribution:
Estimates of Telecommunications Expenditures

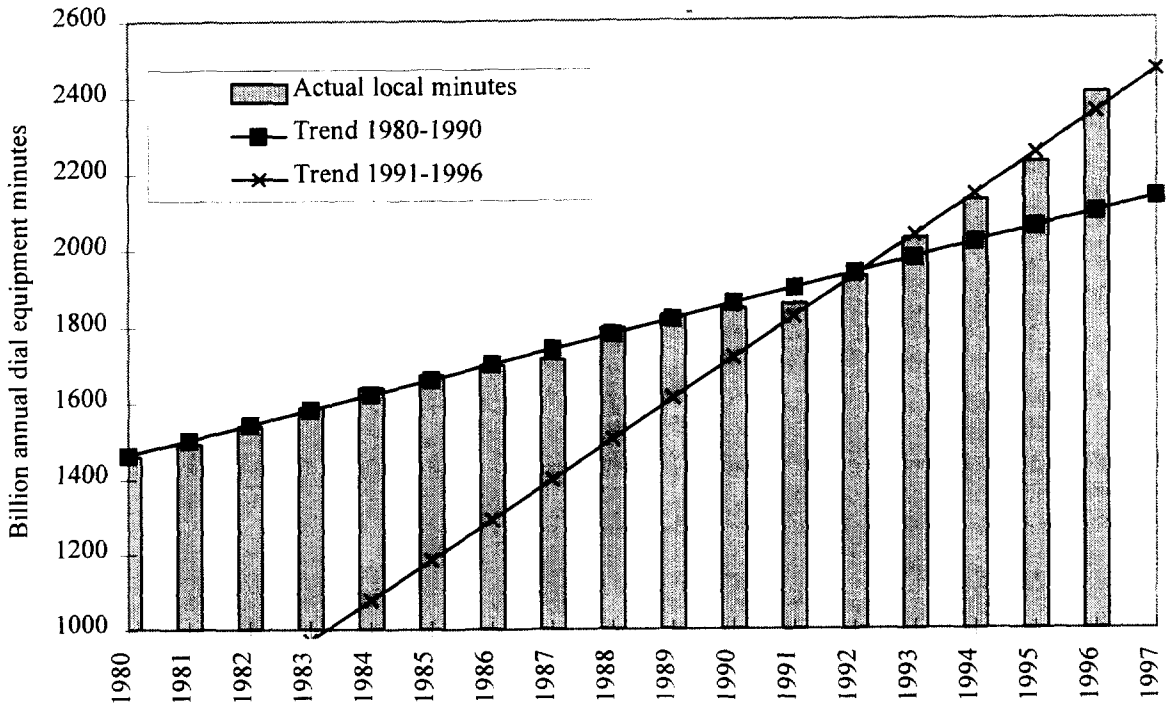

CHART 3, LOCAL CALLING DEM

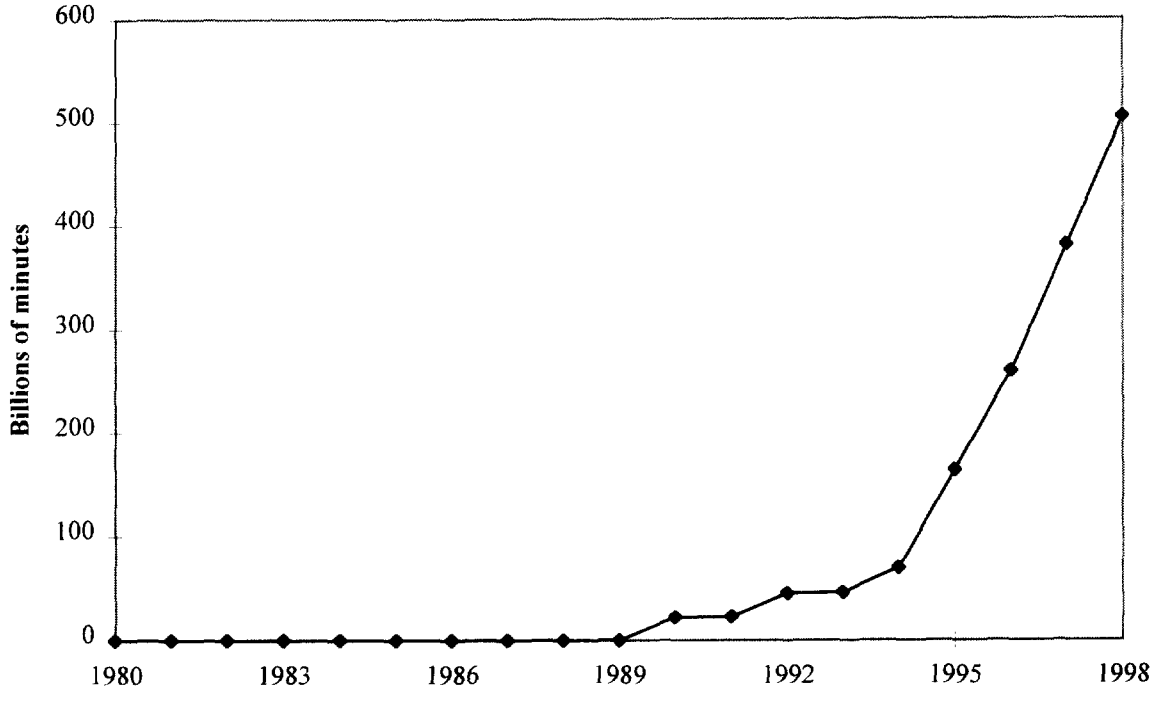

CHART 4, ONLINE SERVICE CONSUMPTION

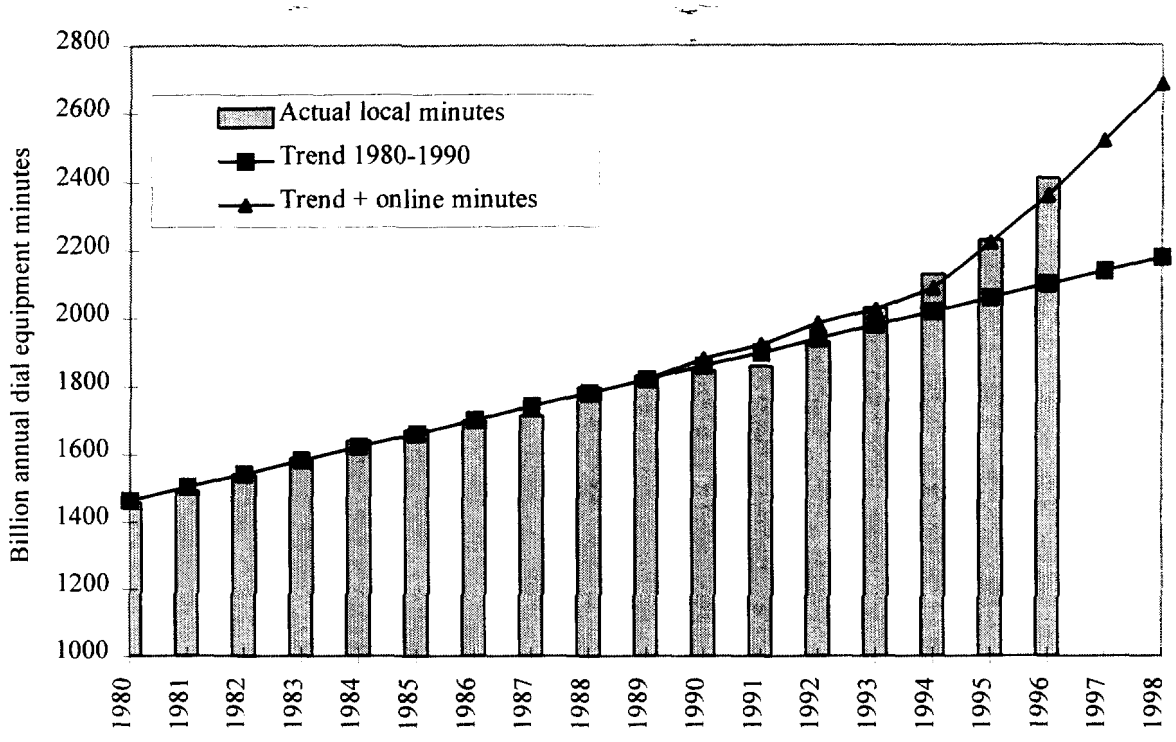

CHART 5, TOTAL LOCAL CALLING DEM DECOMPOSITION

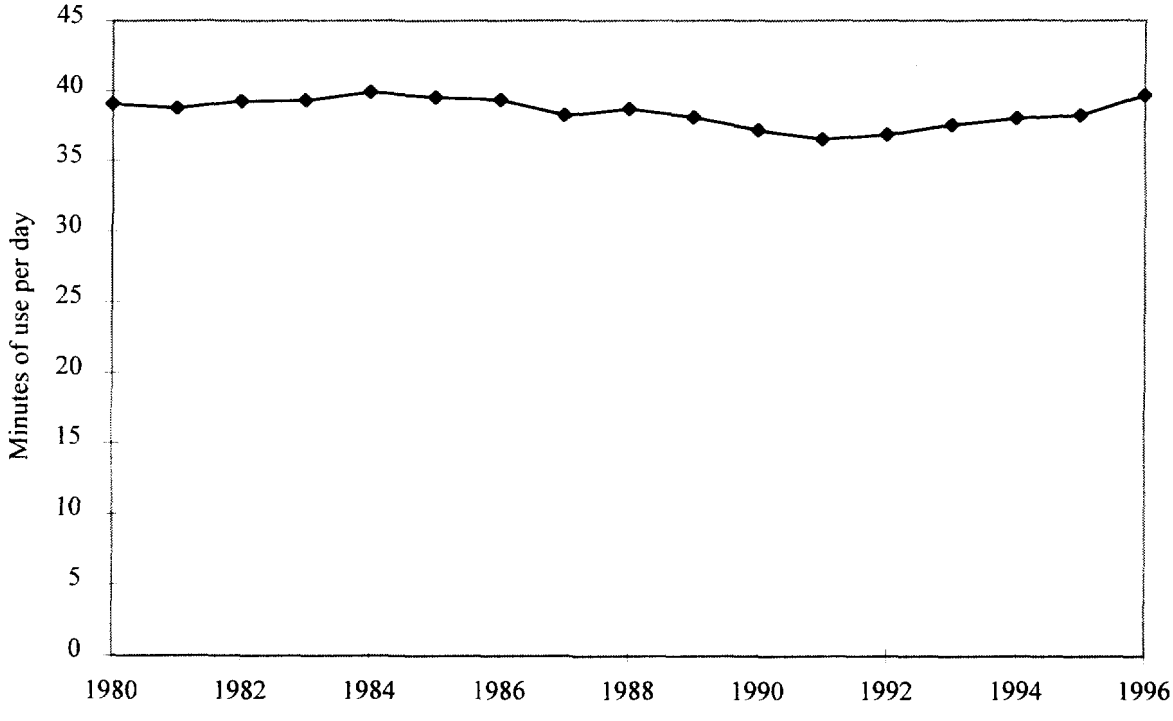

CHART 6, LOCAL CALL MINUTES PER DAY PER LOCAL LOOP

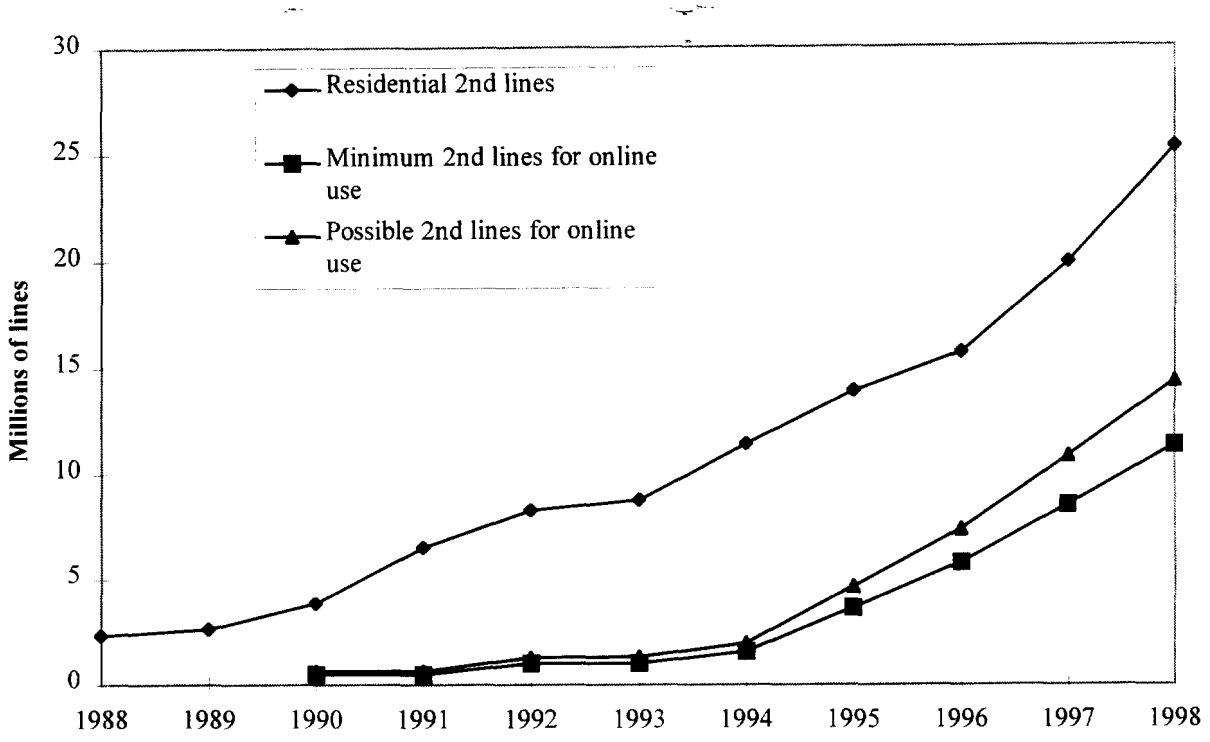

CHART 7, RESIDENTIAL 2ND LINES IN USE

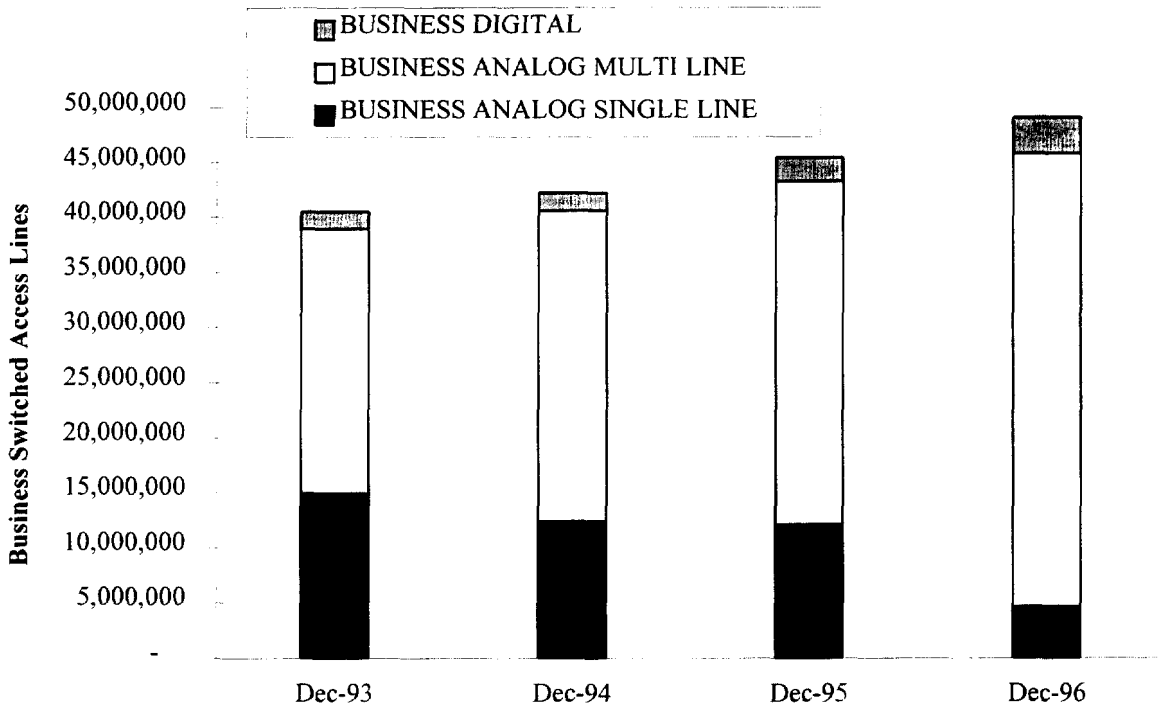

CHART 8, BUSINESS ACCESS LINES BY TECHNOLOGY

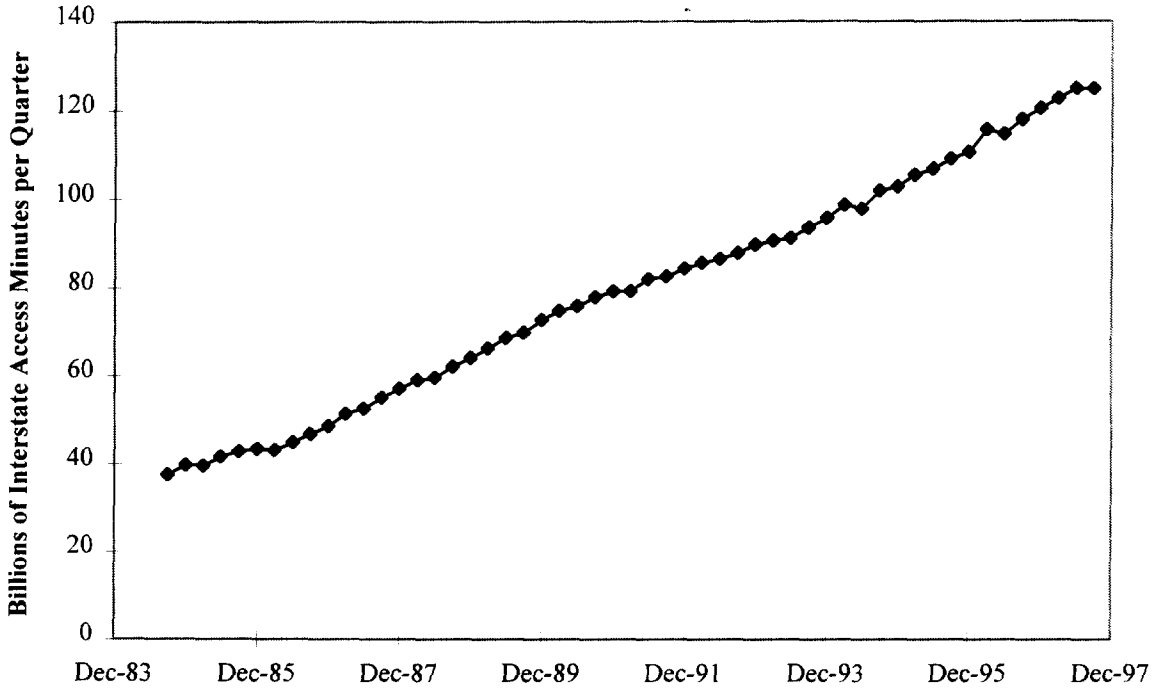

CHART 9, LONG DISTANCE ACCESS MINUTES

DCDOCS: 127859.1 (2qnn01!.doc)